Valve Electronic

ADMIRALTY SURFACE WEAPONS ESTABLISHMENT

CV4085

Specification AD/CV4085 Issue 1A, dated 10.12.63. To be read in conjunction with K1001, BS448 and BS1409	SECURITY	
	Specification	Valve
	Unclassified	Unclassified

Type of valve: Low Hum, Low Microphony Pentode.
Cathode: Indirectly heated.
Envelope: Glass Unmetallised.
Prototype: CV2901

Marking
See K1001/4

Base
B9A

RATINGS

(All limiting values are absolute)

			Note
Heater Voltage	(V)	6.3	
Heater Current	(A)	0.2	
Max Anode Voltage Ia=0	(V)	550	
Max Screen Voltage Ig2=0	(V)	550	
Max Anode Dissipation	(W)	1.0	
Max Screen Dissipation	(W)	0.2	
Max Anode Voltage	(V)	300	
Max Screen Voltage	(V)	200	
Max Cathode Current	(mA)	6.0	
Anode Current	(mA)	3.0	A
Screen Current	(mA)	0.55	A
Mutual Conductance	(mA/V)	1.85	A
Anode Impedance	(megohms)	2.5	A
"Inner" Amplification Factor		38	
Vhk max.	(V)	100	
Max Bulb Temperature	(°C)	165	
Max Shock (Intermittent Operation)	(g)	500	
Max Acceleration (Continuous Operation)	(g)	2.5	
Max external resistance between g1 and k) for Wa=>0.2W	(MΩ)	3	
Max external resistance between g1 and k) for Wa=<0.2W	(MΩ)	10	

Capacitances (pF)

Cag max	0.05	B
Cge	3.8	B
Cae	5.1	B

Connections

Pin	Electrode
1	g2
2	s
3	k
4	h
5	h
6	a
7	s
8	g3
9	g1

Dimensions
BS448/B9A

Dimensions (mm)		Min	Max
A.	Seated Height	-	49.0
C.	Diameter	19	22.2
D.	Overall Length	-	56.0

Mounting Position
Any

NOTES

A. Measured at Va = 250, Vg2 = 140, Vg1 = - 2.0

B. Measured without metal screen.

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Tests

To be performed in addition to those applicable in K1001. Tests shall be performed in the specified order unless otherwise agreed with the Inspection Authority.

Test Conditions

Vh (V)	Va (V)	Vg1 (V)	Vg2 (V)	Vg3 (V)
6.3	250	- 2.0	140	0

K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	LIMITS Min.	LAL	Bogey	UAL	Max.	ALD	Unit
7.1	Glass Strain	No voltages	6.5	I								
	GROUP A											
	Insulation	Vg1-all=-100V		100%	R	100	-	-	-	-		MΩ
		Vg2-all=-300V		100%	R	100	-	-	-	-		MΩ
		Va -all=-300V		100%	R	100	-	-	-	-		MΩ
	Reverse Grid Current	Rg1=500 KΩ max		100%	Ig1	-	-	-	-	0.4		µA
	GROUP B	Combined AQL	2.5									
	Heater Current		0.65	II	Ih	185		200		215		mA
5.3	hk Leakage Current	Vhk ± 100V	0.65	II	Ihk					10		µA
		Vhk - 100V (cathode positive)		V2	Ihk				2			µA
	Anode Current		0.65	II	Ia	2.15	-	-	-	3.85		mA
				V2	Ia		2.69	3.0	3.31		0.8	mA
	Screen Current		0.65	II	Ig2			0.6		0.85		mA
	Mutual Conductance		0.65	II	gm	1.55	-	-	-	2.45		mA/V
				V2	gm		1.83	2.0	2.17		0.37	mA/V
→	Microphony	Note 1	0.65	II	VgAC	-	-	-	-	3.5		mV r.m.s.
	Grid Hum	Notes 2, 3	0.65	II	Hum	-	-	-	-	8		µV
	Cathode Hum	Notes 2, 3	0.65	II	Hum	-	-	-	-	60		µV
	Hiss	Notes 3, 4	0.65	II		-	-	-	-	5		µV
	GROUP C	Combined AQL	6.5	I								
	Anode Current	Vg1 - 7.0V Ra = 1.0M Ω	2.5	I	Ia	-	-	-	-	40		µA
	Change in Mutual Conductance	Vh = 5.7V Note 5	2.5	I	Δgm					15		%
	Reverse Grid Current	Vh = 6.9V Note 6	2.5	I	Ig1					1.0		µA

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K1001	Test	Test Conditions	AQL %	Insp. Level	Symbol	LIMITS Min.	LAL	Bogey	UAL	Max.	ALD	Unit
	GROUP D											
7.2	Base Strain Capacitances	No voltages Measured on a 1 Mc/s bridge with valve mounted in a fully screened socket. Without valve screening can.	6.5 6.5	IA Ic	Cag	-	-	-	-	0.05		pF
					Cin	3.4	-	-	-	4.3		pF
					Cout	4.5	-	-	-	5.8		pF
	Inner Amplification Factor		6.5	IA	μglg2	34		38		42		
	GROUP E											
11.3	Fatigue	Vh=6.9V switched 1 min ON, 3 mins OFF Va=Vg2=0 Acceleration 5g min. Frequency 170 c/s ± 5 c/s. Note 7		IA								
	Post Fatigue Tests	Combined AQL	6.5									
	hk Leakage Current	Vhk ± 100V	2.5		Ihk					20		μA
	Reverse Grid Current	Rgl 500K Ω	2.5		Igl					1.0		μA
	Microphony	As in Group B	2.5		VgAC					6.0		m V r.m.s.
	Cathode Hum	As in Group B	2.5		Hum					120		μV
	Mutual Conductance		2.5		gm	1.0						mA/V
11.4	Shock	Hammer Angle 30° No voltages		IA								
	Post Shock Tests	Combined AQL	6.5									
	hk Leakage Current	Vhk ± 100V	2.5		Ihk					20		μA
	Reverse Grid Current	Rgl=500 K Ω	2.5		Igl					1.0		μA
	Microphony	As in Group B	2.5		VgAC					6.0		m V r.m.s.
	Cathode Hum	As in Group B	2.5		Hum					120		μV
	Mutual Conductance		2.5		gm	1.0						mA/V

K1001	Test	Test Conditions	AQL %	Insp. Level	Sym-bol	LIMITS Min.	LAL	Bogey	UAL	Max.	ALD	Unit
AV1/5	GROUP F	Va=300V Vg2=200V Rk=820 Ω Vhk= + 100V										
	Life											
AV1/5.3	Intermittent Life											
	Test Point 500 hrs.	Combined AQL	6.5	IA								
AV1/5.6	Inoperatives		2.5									
	Heater Current		2.5		Ih	185	-	-	-	215		mA
	hk Leakage Current	Vhk ± 100V	2.5		Ihk					20		µA
	Reverse Grid Current	Rgl 500 k Ω	2.5		Igl	-	-	-	-	0.4		µA
	Mutual Conductance		2.5		gm	1.2	-	-	-	-		mA/V
	Average change in mutual conductance				Δgm					15		%
	Anode Current		4.0		Ia	2.0	-	-	-	3.85		mA
	Insulation	Vgl-all=100V	4.0		R	50	-	-	-	-		MΩ
		Vg2-all=300V	4.0		R	50	-	-	-	-		MΩ
		Va-all=300V	4.0		R	50	-	-	-	-		MΩ
	Cathode Hum	As in Group B	4.0		Hum	-	-	-	-	120		µV
	Hiss	As in Group B	4.0							10		µV
	Test Point 1000 hrs.	Combined AQL	10.0	IA								
AV1/5.6	Inoperatives		4.0									
	hk Leakage Current	Vhk ± 100V	4.0		Ihk							
	Reverse Grid Current	Rgl 500 KΩ	4.0		Igl	-	-	-	-	0.5		µA
	Mutual Conductance		4.0		gm	1.0	-	-	-	-		mA/V
	Anode Current		6.5		Ia	1.5	-	-	-	3.85		mA
	Cathode Hum	As in Group B	6.5		Hum	-	-	-	-	250		µV
	Hiss	As in Group B	6.5							15		µV
	GROUP G											
AIX/2.5	Electrical re-test after 28 days holding period			100%								
AVI/5.6	Inoperatives		0.5									
	Reverse Grid Current		0.5		Igl	-	-	-	-	0.4		µA

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NOTES

→ 1. Readings are to be taken on microphony testing equipment as described in K1001, Appendices X and XII, the valve under test being connected as in Fig. 1 on page 6 of this specification. The valve is to be held with the grid support wires in a horizontal plane. Three impacts are to be applied to the valve, the higher of the last two readings being noted. An a.c. voltage at 1000 c/s is then to be applied to the grid and increased from zero to a value at which the noted reading is again obtained on the p-p voltmeter. The limits in the specification refer to the value of this grid voltage.

2. The valve shall be tested using a low-loss socket. The Hum tests shall be conducted by alternately earthing Pins 4 and 5 the highest reading being recorded.

→ 3. Valves are to be tested as described in K1001, Appendix XII. The limits given in the specification refer to the equivalent grid 1 r.m.s. voltage. The values of the resistors shown in Fig. 1 of Appendix XII are to be R2 = 22 ohms, R4 = 47 kilohms, R5 = 100 kilohms, R6 = 680 kilohms, R9 = 1200 ohms.

4. Hiss tests may be conducted with D.C. heating of the cathode.

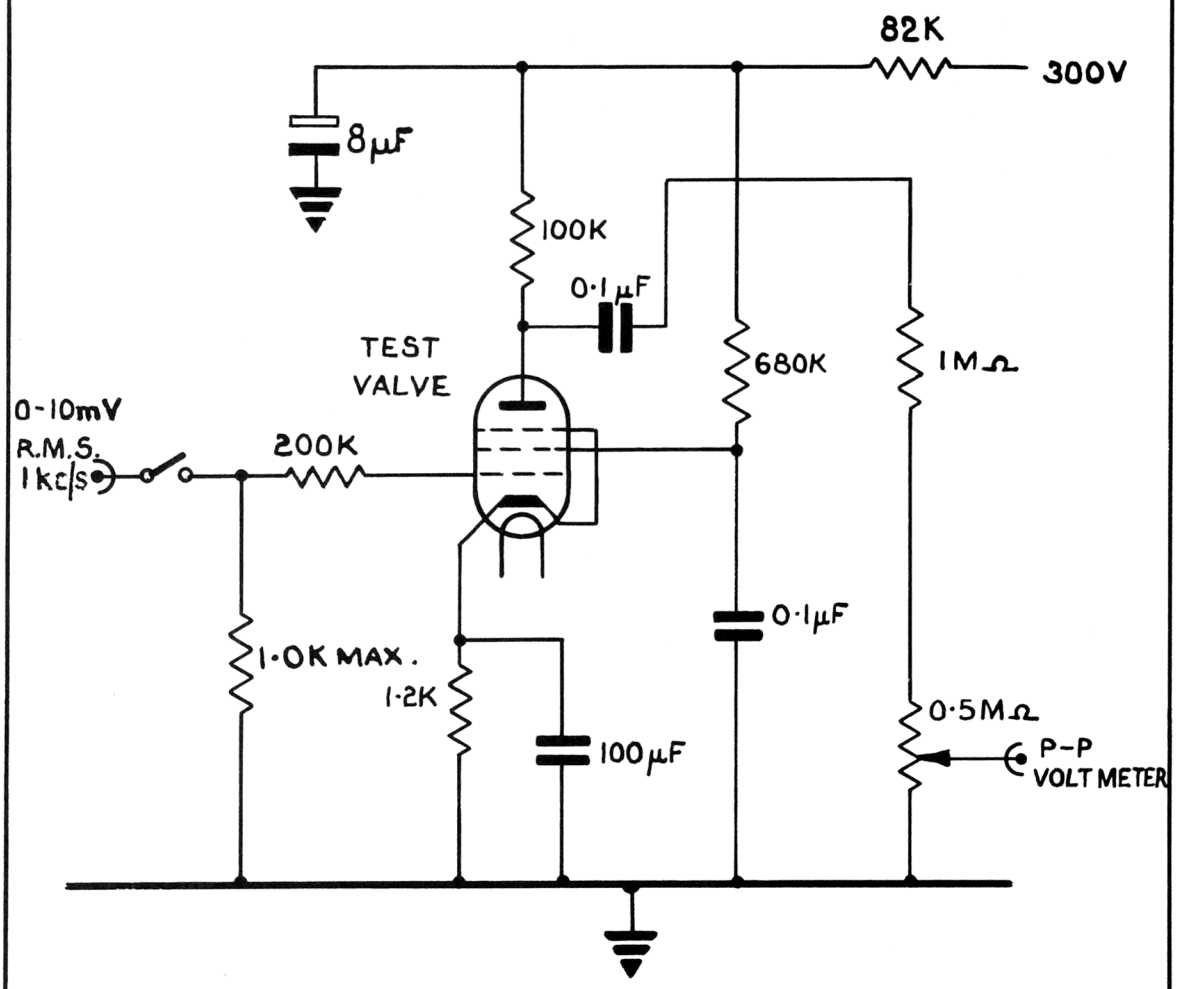
5. The percentage change in mutual conductance is expressed as:

$$\frac{(gm \text{ at } 6.3V - gm \text{ at } 5.7V) \times 100}{gm \text{ at } 6.3V}$$

6. Prior to this test the valve shall be pre-heated at test conditions for 5 minutes. Igl shall not be rising or out of the limits after a total of 10 minutes.

7. Valves shall be vibrated for 33 hours in each of the required planes.

FIG. 1 MICROPHONY TEST CIRCUIT.



13/SAD

SPECIFICATION AD/CV4085 ISSUE 1A DATED 10 DECEMBER 1963

AMENDMENT NO 1

Page 5 NOTE 1, Line 2

DELETE The valve under.

INSERT or Note 8, the valve under.

Page 5 ADD New Note 8

The microphony tap test may be carried out by replacing the K1001 hammer method with an electronic vibrator set to

$h = 52$ g

t_1 at $\frac{1}{2}$ h = 200 /us

t_2 at 0 h = 350 /us

minimum applications 3 in number.

Ref P7048/79/PSV2

March 1979